

## THE COMPETITION EVENTS

**On-Site Mining** – (MANDATORY) requires the teams to design and build a mining robot that can traverse the simulated Martian chaotic terrain. The robot must then excavate the basaltic regolith simulant (called Black Point-1 / BP-1) and the ice simulant (gravel) and return the excavated mass for deposit into the Collector Bin to simulate an off-world mining mission. The teams will have two, 10 minute competition runs to mine the regolith. The abrasive characteristics of the basaltic regolith simulant, the weight and size limitations of the mining robot and the ability to tele-operate it from a remote Mission Control Center are some of the additional factors in the competition.

**Systems Engineering Paper** – (MANDATORY) your paper should discuss the Systems Engineering methods used to design and build your mining robot. The purpose of the systems engineering paper is to encourage the teams to use the systems engineering process while designing, building and testing their robot.

**Outreach Project Report** – (MANDATORY) requires team to detail the type of STEM outreach in their communities, activities provided, numbers reached and are encouraged to reach out to the underserved / underrepresented K-12 students.

**Slide Presentation & Demonstration** – (OPTIONAL) provides the teams with the opportunity to talk and present the spirit, intent and the technical outcome of their design project. This is another opportunity for the students to develop their presenting and public speaking skills that will serve them in thesis and / or doctoral dissertations, job interviews, grant requests, etc.

**Social Media and Public Engagement** – (OPTIONAL) requires the teams to creatively engage the public using social media in robotics and STEM related topics, showcases their universities progress in the design and build of their robot, motivates and encourages K-12 robotic groups to showcase their robots and educates the public about robotics and current NASA missions.